ration; which opinion may be entertained without impiety. The allusion I take to be to the famous *jubilee* proclaimed by Edward III. in the 50th year of his reign, when that great king, full of years and honour, was preparing to take leave of the world.

Time's new year's sand nine turns shall see—The above verses, in my explanation, describe the opening of the present century, nine years turns from which brings us to 1809. In that year, his majesty, if he live to the wishes of his subjects, will accomplish the *fiftieth year* of his reign, and may have a *second sceptered jubilee*. What follows, when *grey* (or age) is to be succeeded by *green* (or youth) I will not pursue; having arrived at the point I most earnestly wish for, and with which I shall be content. Some of your readers may perhaps remark, that the year alluded to is just one century beyond that of Swift's explanation of another prophecy of Merlin's; but with that I have nothing to do, further than to observe, that Dr. Johnson, in writing of it, says, that it cannot be read without amazement.

I am, sir, your constant reader,

OSIRIS.

To the Editor of the Belfast Magazine.

DESCRIPTION OF THE TOWN OF BALLYMENA.

SIR,

A RESIDENCE of eight days, in the town of Ballymena, enabled me to write the following account of it, which I now send you for insertion in your Miscellany, if you think it worthy of a place.

Ballymena is situated on a rising ground, about 21 miles N.W. of Belfast, it consists of four principal, and several smaller streets, and contains about 2500 inhabitants, the houses are built of stone, and have been lately very much improved.—It was formerly called *Kiln-hill-town*, and consisted originally of a few cabins and a kiln for drying corn; I observed two houses which are said to be very old, and are of very curious construction, one end of the front being built in the form of the gable end of a common house and containing a very old fashioned window. A market-house, was first built here in 1680; the present one, with a steeple of about 60 feet high, stands in the centre of the town, upon the site of the old one: here are three houses of worship, viz. a church, a presbyterian meeting-house, and a methodist house; the river Braid which rises in the Claggan mountains, about seven miles from the town, flows through it and joins the Main near Gracehill, it is well stocked with trout, dolochan, &c. near this is a Danish rath, now called the moat, from which is an excellent view of Mr. Adair's (the proprietor of the estate) house and demesne; the house is very poor, but in a good situation. I was told that a better one which stood here, was some years ago destroyed by fire. Here is an excellent weekly market for ¾ wide linens, cows, horses, &c. I have great pleasure in mentioning that it is in contemplation to have lamps erected in the different streets, and it is highly creditable to the inhabitants that they seem unanimous in their wishes for its accomplishment. R.

To the Editor of the Belfast Magazine

SIR,

WHEN an author comes forward to communicate to the public, what he calls discoveries or inventions; he is supposed to have taken his ground deliberately, and to have previously made himself acquainted with those inventions, that preceded his own in the same line: the less apology will therefore be due, for the following observations on a paper signed "*Job Rider*," which appeared in your Magazine for June last.

The hydrometer has hitherto been confined to *one* use, but this author has enumerated no less than *four* uses to which it is applicable, viz. "its accuracy in showing the specific gravity of fluids," second, "its use in showing the temperature, in the same manner as the thermometer," third, "how it may be made to act as a baroscope;" and fourth, "how it is convertible into a barometer." "In the course of business I made an hydrometer, of which the ball

was two inches diameter, and the stem .02 of an inch diameter, and twelve inches long: by this instrument, I found the specific gravity of water sensibly changed, when only one ounce of alkaline salt was mixed with four hundred gallons of water."*

It is well known that hydrometers show the specific gravities of fluids, by displacing a quantity of each, equal in weight to the whole instrument; but whose bulks are equal only to the immerged parts thereof, and since those comparative bulks are shown on the stem, therefore the smaller the stem, the greater accuracy is the instrument capable of. But mere accuracy may be purchased too dear, if at the expense of every other good property of the instrument, as seems to be the case in this instance; for were it even practicable to divide, or mark with figures, the stem of an hydrometer one-fiftieth of an inch diameter (a thread of glass little thicker than a horse hair) who would submit to the trouble and caution necessary in using such an instrument? not to mention that its range would be so limited as to render it nearly useless in practice: for supposing the ball two inches in diameter, a globe of this dimension, would contain 4,154 cubic inches; this bulk of common water, would weigh about 888 grains, this divided by 8 grains, the supposed weight of the stem, would give a quotient of 111, two fluids therefore whose specific gravities differed more than 111th part of that of the greater, could not be compared by this instrument.

The author informs us that having increased the heat of water from 50 to 75 degrees, he was surprized to find the above instrument sink in it, the whole length of the stem (12 inches) and thence concludes that as the instrument would serve for a hydrometer in different fluids with the same temperature, so also, it would act as a thermometer, in the same fluid, with different temperatures; but he shows no use or purpose, to which this *warm water thermometer* could be applied.

"When I reflected on the discovery I had now made, &c." there is no new discovery apparent here, for that fluids dilate with heat, condense with cold, is a discovery as old as the thermometer itself, since its invention must have been owing to a knowledge of this very principle.—Moreover it is a fact, well known to every dealer in spirits, that thermometers, accompanied with sliding rulers, to facilitate calculation, have long been in use, for the more accurate measurement of the strength of spirituous liquors.

"When I reflected on the discovery I had now made that this instrument rendered the degrees of heat and cold very conspicuous, by the specific gravity of the water being varied according to the temperature, the following idea occurred to my mind; if a large ball or glass bubble hermetically sealed, were placed on the top of the stem, S (see the figure) at *a*, and adjusted by balance so that the surface of the water might intersect the stem S, at C; after such adjustment, should the air become specifically heavier, the bubble would be moved upwards, and find its balance by moving more of the stem S, out of the water into the air; if the air became lighter the reverse would be the effect.

"In trying the experiment the result exactly agreed with the idea before mentioned, so that during the time the temperature remained the same, the instrument possessed all the properties of the baroscope, but in different temperatures and fluids, it contains the united properties of the *hydrometer, thermometer,* and *barometer.*"

The usual mode of philosophizing, is to establish theory from experiment, but Mr. Rider has chosen a shorter course; in the true spirit of philosophical knight-errantry, he boldly erects a theory, and then roundly asserts that experiment "exactly agreed" with it.

The idea of making a glass baloon not only to float in air, but to

* In a note the author informs us, that this hydrometer was made of glass, it being less liable than metals to expand, or contract, with change of temperature.

have levity or buoyancy, sufficient to move upwards a hydrometer immersed in water, is certainly a very pretty conceit, and no one will deny it the merit of originality; pity that one trifling objection may be brought against it, which cannot be removed while glass continues to be specifically heavier than air, viz. that of *impossibility*.* How has it happened that an absurdity so glaring, should have escaped the notice of an "observing artist?"

But supposing this machine to possess all the three properties which its inventor fondly attributes to it, no small degree of ingenuity would be necessary to discover to what use it could be applied, unless attended by three other instruments to explain its meaning; for example, supposing the stem to have rose half an inch, or to have sunk as much, how could it be ascertained, whether such alteration has been owing to a change of density of the fluid, a change of temperature, or a change of density in the atmosphere; without having a hydrometer, thermometer, and barometer, to refer such alterations to?

The next thing that occurred to my my mind was, to discover how this instrument could be employed as a barometer only; this I effected by a small alteration, as follows:—" A tedious description may be saved here, by referring to the print, and stating that the alteration consists merely in removing the air baloon from the top of the stem, and attaching a small round bottle, with its open neck downwards to the bottom of the large bulb; If this instrument is held in a perpendicular position, when immersed in water, the small bottle will necessarily be partly filled with air, and partly with water; and we are told, that by careful adjustment in different temperatures, the quantities of air and water may be so proportioned to each other, that the instrument will neither sink with heat, nor rise with cold; but we are not informed by what means this adjustment is so perfectly made. The machine is now, neither a hydrometer, nor a thermometer, because the causes affecting it in those different capacities, are supposed completely to counteract each other. And as the inventor had imagined that the instrument, in its second stage of improvement, possessed three properties, and having destroyed two of them, he probably reasoned arithmetically, thus, *from three take two, and one remains*; and therefore concludes this instrument must now be an accurate barometer! The author proceeds: "But should the stem be too small, it cannot stand at any determined height; or, in other words, will not be a balance to the air at any height of the stem, because more water will go into the small ball, by its being depressed by the water's increasing depth, or pressure, than space taken up by the stem in going through the same space; and should it be too large, the space it will move through, from the variations of the atmosphere, will be but small. But when all its parts are duly proportioned and adjusted, it shows the minute barometrical changes of the atmosphere, more visibly than any instrument I have yet seen."

There is so much obscurity in the former part of this passage, that it were no easy task to develope the author's meaning: the probability is, however, that he means the direct contrary of what he expresses; for unquestionably, it is the *thickness*, and consequent *weight* of the stem, that would cause the instrument to sink, and receive more water, and not its smaliness; since, *cæteris paribus*, the smaller and lighter the stem, the more steadily and upright will the instrument stand in any fluid in which it is immersed. Mr. Rider has also neglected to inform us, what those proportions were that rendered the instrument so perfect.

Since fluids press in all directions, in proportion to their depth, without any regard to their quantity, those minute changes which the author mentions, are partly owing to another cause, besides the atmospherical changes, and which are to be superadded thereto,

* Surely it is unnecessary to prove, that no glass baloon, whatever its size may be, could be made light enough to float in air; for were it possible to make it as large as a church, still it must be heavier than the same bulk of common air, by the excess of the weight of the glass, shell, or covering, above the same dimensions of atmospheric air.

viz. the different depths to which the air bubble may be moved by the atmospherical changes; this, however, is rather advantageous than otherwise, since it encreases the motions, without altering their proportions.

The principle of showing the changes of the atmosphere, by a bubble of air under water, is not new, as this author seems to suppose; it was adopted by a Mr. Caswell, Dr. Hook, and others, early in the last century. The hint was perhaps taken from the machine of dancing figures, or little men, described in Gravensend's Elements of Natural Philosophy (see vol. 1st. art. 462).

These little glass images are made hollow, and specifically lighter than water, and each has a small hole in one of its feet, by which water may enter; they are immersed in a tall glass receiver, nearly filled with water, and made air-tight, by means of a flaccid bladder tied over the top; by pressing on the bladder with the hand, the air under it is reduced to less space, the surface of the water will thereby be compressed, and water will be forced into the little figures, through the hole in their feet, which will cause them to descend, and when the pressure of the hand is removed, they will again rise, &c. The principle seems better adapted to a toy of this kind, than to a barometer.

A great variety of constructions of this instrument, have been from time to time invented, and most of them have had for their object the enlargement of the scale, or range of motion of the mercury, in the upright tube, from three inches (the usual range in this country) to almost any indefinite length.

Hence the contrivances of the diagonal barometer, and wheel barometer, &c. but it has been found from experience, that inaccuracy, arising from friction, &c. has always been increased in the same proportion, as the scale has been lengthened, and therefore they have all given place to the upright *Torrecellian* tube, in every case where great accuracy is required, such as measuring the height of mountains, &c. for with the late improved constructions, if well executed, a vernier scale can be applied, which will determine the heights of the mercury to the 1000th part of an inch: the use of which would be totally impracticable with any construction, where the changes are shown by a stem of glass, or of metal, rising out of water.

But there are other strong reasons why this instrument cannot be an accurate barometer.

1. Late experiments have proved, that water is at its greatest degree of condensation, at the temperature of 42½ degrees on *Fareinheit's* scale: therefore supposing it practicable, to adjust the proportions of air, and water in the small ball, perfectly to each other, at a temperature above 42½ degrees (which is very doubtful, as no means are pointed out for this purpose) yet the same adjustment would not serve for a temperature below the same degree: because the two qualities of the hydrometer and thermometer, which are opposed to each other, where the temperature is *above* 42½ degrees would coincide when *below* it; consequently a greater degree of cold would cause the bulb to sink, without any additional pressure of the atmosphere.

2. Air that is long confined under water, is found to change its elasticity, either from part of it being decomposed, or mixing with that contained in the water, and lastly the instrument must be totally useless during frost. If these remarks are well founded, it follows, that all this *airy* structure, which has cost the author so much pains to dedicate to fame, "vanishes like the baseless fabric of a vision and leaves not a wreck behind."

C. Fergus, July 30, 1809. MECHANICUS.

For the Belfast Monthly Magazine.

ON PROVIDING EMPLOYMENT FOR THE INDUSTRIOUS POOR OF THE CLASS OF FIELD LABOURERS.

THE laudable endeavours which have been made in Belfast for the suppression of mendicity demands the gratitude of all its industrious inhabitants; and should be furthered by them in every possible way; the writer of this paper therefore with this view begs leave to communicate some